Space Weather Forecast

Issued on Sunday 20 October 2024 at 13:05 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor geomagnetic storms (G1) peaking into new UTC working week. Initially reducing chance of Minor radio blackouts (R1), rising later in period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has remained moderate, with a low-end Moderate-class X-ray flare from an offgoing complex and active sunspot region at 19/1434UTC.

There are now up to nine sunspot regions on the facing side of the Sun. The recent most active group is now straddling the western solar horizon, and only the easternmost trailing spot is visible. Meanwhile, two new minor regions are becoming visible in the far east.

Of the remainder of the current regions, the most changed and nominally most complex has been a magnetically bipolar group in the southwest. This group showed shear and development of leading sunspot area and number, as well as some proliferation of spots within its centre. Changes in other groups were mostly of slow decay or else slow growth, but the latter from starting points of lower complexity.

No Earth-directed CMEs were observed.

Solar Wind / Geomagnetic Activity: The solar wind environment showed two main behaviours in the 24 hours: an erratic general increase in many measures to 19/2000UTC, followed by a smoother decrease thereafter. While not conclusive, these effects may be due to skirting a fast wind stream from a northwestern 'coronal hole'.

Solar winds speeds rose to a slightly elevated peak near 19/2000UTC before declining by the period's end. The number of particles in the solar wind was within its typical range, but peaked around the time of the transition between behaviours. The associated magnetic field was highest to start the 24 hours, gradually decreasing over the ensuing day. The north-south component was mainly anti-aligned with Earth's field early in the period, becoming smaller-scale and more neutral into the current UTC day.

The net result of the above solar wind measures was for activity below Minor geomagnetic storm G1, but coming closest in the 18-21UTC interval while the wind was fastest and of generally unfavourable magnetic orientation.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

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Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is forecast, with isolated Moderate-class flares most likely to bookend the four days as the recent most active spot group leaves the facing side imminently, and as expected returning regions then gradually arrive into the new UTC week.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs currently forecast. The current possible fast wind from the northwestern coronal hole is now waning and further significant geomagnetic activity is now unlikely.

A second fast wind from a more centrally-located coronal hole (and therefore eventually more aligned with Earth) is possible later on day 2 (21 Oct), but more likely on day 3 (22 Oct). This may bring a chance of Minor geomagnetic storm G1 conditions at peak into the new UTC working week, before activity declines into day 4 (23 Oct). Surrounding activity should be quieter.

Energetic Particles / Solar Radiation: No solar radiation storms are likely.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	20	50	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	50	30	40	60
Very Active	R3-R5 (X Class)	No	10	5	5	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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